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EFFECT OF COMMERCIAL VEHICLE TAXATION ON CONSUMER PRICES

A REPORT TO
THE MONTANA FACT FINDING COMMITTEE
ON HIGHWAYS

WILLIAM S. PETERS

AND

FREDERICK W. HARRIS

REGIONAL STUDY NO. 6
November 1956

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EFFECT OF COMMERCIAL VEHICLE TAXATION ON CONSUMER PRICES

A Report to The

MONTANA FACT FINDING COMMITTEE ON HIGHWAYS, STREETS AND BRIDGES

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Regional Study No. 6
November, 1956

Bureau of Business and Economic Research
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PREFACE

The Effect of Commercial Vehicle Taxation on Consumer Prices, a report to the Montana Fact Finding Committee on Highways, Streets and Bridges, was submitted in November 1956. The issuance of this reprint has resulted from the continued demand for copies of the report in the face of an exhausted supply.

The Fact Finding Committee was organized on April 1, 1955 in accordance with the provisions of Chapter 99, Laws of Montana, 1955. The Committee consisted of twelve members appointed by Governor J. Hugo Aronson. The chairman, elected by the members, was George B. Schotte of Butte. The executive director was William L. Hall, Transportation Economist, Bureau of Public Roads (Portland, Oregon office).

The function of the Committee was to make recommendations to the 1957 Montana Legislative Assembly on the subjects of necessary changes in the methods of constructing and maintaining highways, streets and bridges in the state; adequate and equitable methods of licensing and taxing motor vehicles and other property to permit the financing of an adequate and proper program; and the allocation of responsibility and moneys between the state, counties and cities in order to provide for an adequate highway program.

To permit the meeting of these objectives a series of studies was done by or for the Fact Finding Committee. This report contains the findings of one such study.

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Missoula, Montana
June 24, 1958

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OBJECTIVES, METHOD, AND SUMMARY OF RESULTS

Objectives

This study has been conducted at the request of the Montana Fact Finding Committee on Highways. Its objective is to evaluate the possible effects of proposed schedules of gross vehicle weight-distance taxes upon the delivered prices of commodities shipped by truck. We examine first two schedules in effect in neighboring states, and finally the schedule actually proposed for Montana. The term "possible effects" means that we have allocated the entire burden of any resulting increases over the existing tax system to the delivered commodity. The results thus indicate the possible increase in the cost of goods delivered to a buyer. While it is true that part or all of a transportation tax increase may be absorbed by the seller of goods or by the transportation agency, we undertook specifically to determine what the maximum effect on ultimate buyers could be if these other agencies were successful in passing on to the buyer the exact equivalent of the increased transportation tax.

General Method

Attention was focused on "the truck" because the amount of increase in the tax burden on a unit of a delivered commodity will vary, depending on many factors which can be associated with the hauling unit. It was necessary to consider the possible degree of variation in a number of factors to produce meaningful final answers. The factors specifically taken into account were:

1. Gross vehicle weight of truck: Selected gross vehicle weight classes were treated separately, since the rates on both present and proposed schedules are different for the several gross vehicle weight classes.

2. Fuel consumption per mile: Some of the tax schedules studied eliminate the tax on diesel fuel in favor of higher mileage tax rates. Part

of the change in tax costs per mile thus depends on how much fuel the hauling unit under consideration consumes per mile. Fuel consumption per mile was taken into account at various levels.

3. Total miles travelled per year by the trucking unit: Since all of the tax schedules considered include a flat fee element, the tax costs per mile will depend upon how many miles the truck unit travels in a year. A range of total annual miles was selected for each truck type and different annual miles covering each range were carried throughout the study.

4. Commodities and payloads: When an increase in tax burden per mile with all of the preceding variations is obtained, its eventual impact on a pound of delivered goods will depend upon characteristics of the load carried. Commodities which are heavy in relation to their value will receive increased tax burdens which are greater in relation to their price than will commodities of high value in relation to weight. Therefore, the study includes examples from several commodity groups. Further, for a given commodity group or particular commodity, the effective tax increase will depend on whether it is typically carried as part of a full capacity load, or with a half empty load or less. This is so because the weight-distance taxes are not based on actual payloads, but on registered gross vehicle weight. For this reason the general analysis takes into account variation in loads, and particular loads are specified in each illustrative example.

5. Length of trip: The increased transportation tax burden depends on how far the commodity travels by truck in Montana to the delivery point. Therefore, general tables of effects include the distance factor and in

all illustrations the trip mileage is specified.

Summary of Results

For most goods bought by consumers, the possible effect of the proposed Montana weight-distance tax is negligible. For instance, the most heavily affected among a selected group of grocery items is potatoes, where the possible increase under certain conditions of transport approximates 1/10th of a cent on a 10 pound bag of potatoes retailing for 57 cents. Among items of home furnishings typical impacts run even smaller. On several items of furniture and equipment, an illustrative haul results in impacts in relation to delivered price of about one part in 5000. This means a potential ten cent increase from the proposed tax on a suite of furniture priced at $500. retail.

As a generalization, one may say that the value of materials hauled must be less than three cents a pound for a realistic haul to result in increased tax charges as high as one per cent of the value of the materials delivered. Among the goods which could fall into this category are logs, fertilizer and feed, and some grains, with wheat falling about at this breaking point. Even in some of these cases, the hauls would have to be quite long, or represent trips where no "back haul" was available. (See Table 12)

The increases in operating costs per mile implied by the proposed tax vary depending on the truck type, its intensity of use, and its fuel consumption. Two and one-half cents per mile appears to be a reasonable figure for larger diesel trucks. Such an increase can amount to a 5 to 8 per cent increase in operating costs. If the goods are hauled by public carrier, the carrier may well seek rate raises which would transmit some of the increase in tax cost to the transportation customer. If the hauling unit

is owned by the shipper, he is of course free to attempt to pass on the additional costs to the buyer if he so chooses. If rate raises are found justified and approved for public carriers,[1] the next question is whether the producing or marketing intermediaries will pass along the increases to the ultimate buyer.

It is not in the scope of this study to pass judgment on the justification of rate raises from the point of view of the trucker, or to predict whether raises will be granted by the responsible public authority. But if the increased tax burden is passed to marketing intermediaries, we believe that, with some exceptions it will stay there. First, the likely increases represent fractions of one per cent of retail prices. Many of these increases would be lost, both in magnitude and traceability, in the general costs of doing business. Finally, even if traced or allocated arbitrarily to specific items on the retail shelves, increases of this magnitude are not likely to bring about changes in retail prices. Retail prices are characteristically insensitive to much greater changes in wholesale prices than these tax increases would occasion, even granted that they would have this latter result.

We have reservations concerning bulky low value products such as logs, feeds and fertilizers, and bulk grains. The increased tax burden here can approach one per cent of the value of the goods. Loads are more frequently unmixed. The products pass through subsequent production and marketing stages in more homogeneous lots, so that costs are easier to trace. It is

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[1] If rail freight rate raises currently being discussed ultimately go into effect, this likelihood would seem to be increased.

impossible to predict where the burden will ultimately rest. The point is that the cost can be large enough in these cases to be of significance to the concerns involved, and that costs can be more easily transmitted either back to the prime producer or forward to the ultimate household consumer or purchaser of farm supplies.

As a final note, the fact that the tax burden may fall ultimately on producers, marketers, and to some extent consumers as well as transportation agencies should not be regarded as undesirable of itself. Certainly the truckers are not the sole beneficiaries of the highway expenditures which a proper incremental cost study may assign to their commercial vehicles. They provide the transportation service, and the philosophy of a tax system can be to collect from them in the first instance the cost that the state incurs on their behalf. But in turn, the transportation customer and his customer on down to the ultimate consumer are also beneficiaries in a real sense. By the time the increased tax cost is diffused among these various beneficiaries, it is, in any absolute sense of the word, small.

THE STUDY IN DETAIL

Background of the Study

The Montana Fact Finding Committee on Highways, Streets, and Bridges was established by act of the Montana State Legislature. In addition to other studies, the Committee was specifically directed to investigate problems connected with the possible imposition of a weight-distance tax on commercial vehicles in the state. The Report and Recommendations of the Governor's Interim Highway Committee (1954) contains the following passage:

> "The possible adoption of a mileage tax on commercial vehicles was the subject of much discussion and consideration by your committee. While the general feeling was that this was the most equitable type of highway use tax, the experience in most states points out the necessity of a thorough study and complete assembly of facts to assure successful operation and acceptance by the users. The outstanding success of the Oregon weight-distance tax demonstrates the effectiveness of this form of taxation while the failure in several states, where supposedly similar systems were adopted and ended in failure, leads your committee to recommend further study before adoption of such a proposal."

Weight-Distance Taxation

A weight-distance tax is any tax in which the amount of tax liability varies by both the weight of the vehicle and distance travelled. This may be accomplished by a fixed rate of taxation per ton-mile on an empty weight, actual weight, or maximum weight basis. Or it may be accomplished, as in the present proposals, by a schedule of tax rates per mile of travel in which the tax rates vary for different weights.

Regardless of the particular weight basis employed, weight-distance taxation is a method of assessing taxes against users of the highways as

opposed to the general population. User taxation is not new, but support seems to be growing for its more extensive application. A recent report of the Committee for Economic Development states the following:[1]

> "On balance and as a practical matter, the Committee recommends that both state governments and the federal government rely mainly on user charges to finance highway improvements. User charges impose the cost of highway construction where the greatest benefits lie. At the same time, with an adequate highway system, users will get in return for increased user payments a greater value in terms of time saved and operating costs reduced."

Attempts to apportion user taxes among various users have been based on considerations of 1) Benefits, 2) Use, 3) Cost, and 4) Ability to Pay.[2] While it is not the task of this report to evaluate various bases of taxation, it is appropriate to point out that weight-distance taxation involves an assumption, tacit or expressed, that weight and distance are directly related to one or more of the considerations listed above. For instance, one argument for using a gross vehicle weight basis rather than empty or actual weight hinges on acceptance of "cost" as a proper basis for allocating taxes. Maximum or gross vehicle weights reflect not actual use, but rather maximum needs which the highway system will be called upon to serve. These needs are a major determinant of construction costs.

Existing and Proposed Tax Schedules

To trace through the effects of weight-distance taxes on commercial

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[1] "Modernizing the Nation's Highways," A Statement on National Policy by the Research and Policy Committee of the Committee for Economic Development, January, 1956.

[2] Allocation of Road and Street Costs, Part III, Bases for Weight-Distance Taxation in the State of Washington, by Joseph W. McGuire, Washington State Council for Highway Research, June 1956.

vehicles two tax schedules now in effect in neighboring northwestern states were selected for comparison with present Montana rates. These are termed "Minimum fees" (based on Idaho rates) and "Maximum fees" (based on Oregon rates) in the belief that a schedule of such taxes if ultimately imposed in Montana would lie somewhere between the two. The three schedules of fees are presented in Table 1.

Effects of Tax Schedules per Mile of Travel

Conversion of the tax schedules to dollar costs per mile of travel provides a relevant basis for comparing them. Before this can be done various annual miles of travel must be specified, since the degree to which the "flat fee" element is spread out depends on the number of miles travelled. The cost per mile of travel will also depend on the fuel consumption of the vehicle because the impact of the fuel tax per mile of travel is larger for vehicles consuming fuel less efficiently.

Accordingly, a range of annual miles and of fuel consumption per mile was used in reducing the taxes to a per mile of travel basis. Some of the results of this reduction are shown in Tables 2A and 2B and Charts 1A and 1B.

Based on costs per mile, all three tax schedules impose higher charges on the heavier vehicles. By comparing the 25,000 annual miles with the 50,000 annual miles chart, one can also see that the differences between the present Montana rates and the two schedules under consideration become greater with increasing annual mileage. This is to be expected from the differing nature of flat fee taxes and taxes based on mileage.

Table 1
Present Montana, Proposed Maximum and Minimum Fees by Gross Vehicle Weight of Unit or Combination

Present Montana Fees

Combined or Gross Weight	Annual Flat Fee	Fuel Tax Per Gallon
12,000	$ 26.00	$ 0.07
19,000	50.00	.07
24,000	85.00	.07
40,000	100.00	.07
60,000 (Diesel)	355.00	.09
68,000 (Diesel)	530.00	.09
74,000 (Diesel)	665.00	.09
76,000 (Diesel)	740.00	.09
78,000 (Diesel)	755.00	.09

Maximum Fees (Based on Oregon Fees)

			Mileage Fees (Mills)	
Combined or Gross Weight	Annual Flat Fee	Fuel Tax Per Gallon	Diesel Powered	Gasoline Powered
12,000	$ 36.90	$ 0.07		4.5
19,000	51.10	.07		8.5
24,000	64.95	.07		10.5
40,000	123.10	.07		19.0
60,000 (Diesel)	172.00	Diesel trucks	50.	
68,000 (Diesel)	192.20	under mileage	58.	
74,000 (Diesel)	217.40	fee exempt.	65.	
76,000 (Diesel)	224.80		68.	
78,000 (Diesel)	232.45		71.	

Minimum Fees (Based on Idaho Fees)

Combined or Gross Weight	Annual Flat Fee	Fuel Tax Per Gallon	Mileage Fees (Mills)
12,000	$ 25.00	$ 0.07	
19,000	55.00	.07	5.95
24,000	55.00	.07	7.35
40,000	102.00	.07	13.30
60,000 (Diesel)	102.00	.09	23.80
68,000 (Diesel)	102.00	.09	28.00
74,000 (Diesel)	102.00	.09	31.85
76,000 (Diesel)	102.00	.09	33.60
78,000 (Diesel)	102.00	.09	35.35

Table 2A
Dollar Costs Per Mile of Alternative Tax Schedules by Gross Vehicle Weight and Operating Conditions
(Gasoline Powered Vehicles)

G.V.W. Class:	Schedule and Annual Miles of Operation in Montana								
& Miles per	Montana			Idaho			Oregon		
Gal. of Fuel	10,000	25,000	50,000	10,000	25,000	50,000	10,000	25,000	50,000
12,000									
6 m.p.g.	$.0143	$.0127	-----	$.0142	$.0127	-----	$.0199	$.0176	-----
9 m.p.g.	.0104	.0088	-----	.0103	.0088	-----	.0160	.0137	-----
19,000									
6 m.p.g.	.0167	.0137	.0127	.0231	.0198	.0187	.0253	.0222	.0212
9 m.p.g.	.0128	.0098	.0088	.0192	.0159	.0148	.0214	.0183	.0173
24,000									
6 m.p.g.	-----	.0151	.0134	-----	.0212	.0201	-----	.0248	.0235
9 m.p.g.	-----	.0112	.0095	-----	.0173	.0162	-----	.0209	.0196
40,000									
6 m.p.g.	-----	.0157	.0137	-----	.0290	.0270	-----	.0356	.0332
9 m.p.g.	-----	.0118	.0098	-----	.0252	.0231	-----	.0317	.0292

Table 2B
Dollar Costs per Mile of Alternative Tax Schedules By Gross Vehicle Weight and Operating Conditions
(Diesel Powered Vehicles)

G.V.W. Class: & Miles per : Gal. of Fuel:	Schedule and Annual Miles of Operation In Montana								
	Montana			Idaho			Oregon		
	25,000	50,000	100,000	25,000	50,000	100,000	25,000	50,000	100,000
60,000									
3 m.p.g.	$.0442	$.0371	$.0336	$.0579	$.0558	$.0548	$.0569	$.0534	$.0517
5 m.p.g.	.0322	.0251	.0216	.0459	.0438	.0428	.0569	.0534	.0517
68,000									
3 m.p.g.	.0512	.0406	.0353	.0621	.0600	.0590	.0657	.0618	.0599
5 m.p.g.	.0392	.0286	.0233	.0501	.0480	.0470	.0657	.0618	.0599
74,000									
3 m.p.g.	.0566	.0433	.0366	.0659	.0639	.0629	.0737	.0693	.0672
5 m.p.g.	.0446	.0313	.0246	.0539	.0519	.0509	.0737	.0693	.0672
76,000									
3 m.p.g.	.0596	.0448	.0374	.0677	.0656	.0646	.0770	.0725	.0703
5 m.p.g.	.0476	.0328	.0254	.0557	.0535	.0526	.0770	.0725	.0703
78,000									
3 m.p.g.	.0602	.0451	.0376	.0694	.0674	.0664	.0803	.0756	.0733
5 m.p.g.	.0482	.0331	.0256	.0574	.0554	.0554	.0803	.0756	.0733

CHART 1 - A

COSTS PER MILE OF OPERATION UNDER VARYING CONDITIONS
BY GROSS VEHICLE WEIGHT CLASSES - MONTANA
IDAHO & OREGON CURRENT TAX SCHEDULES

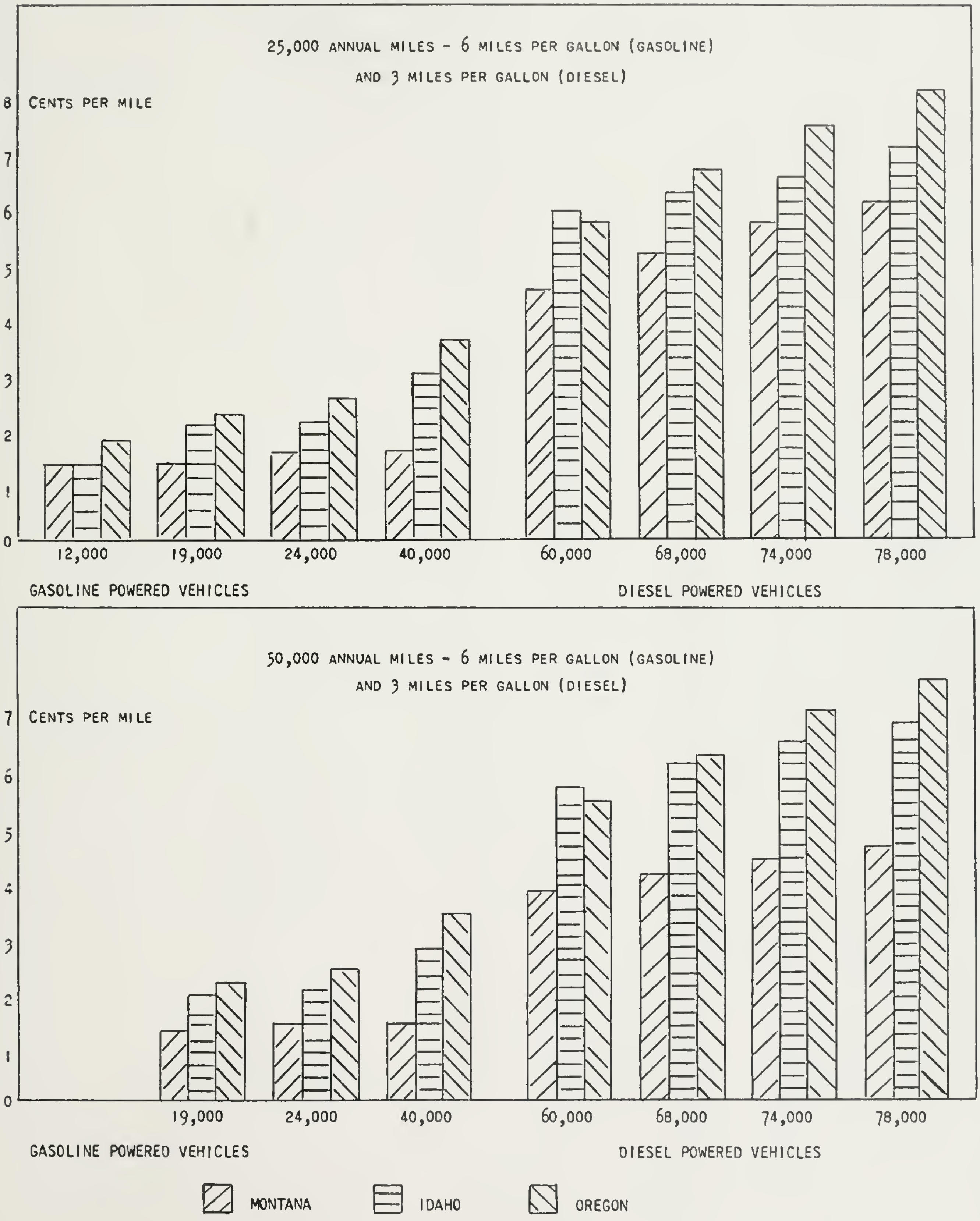
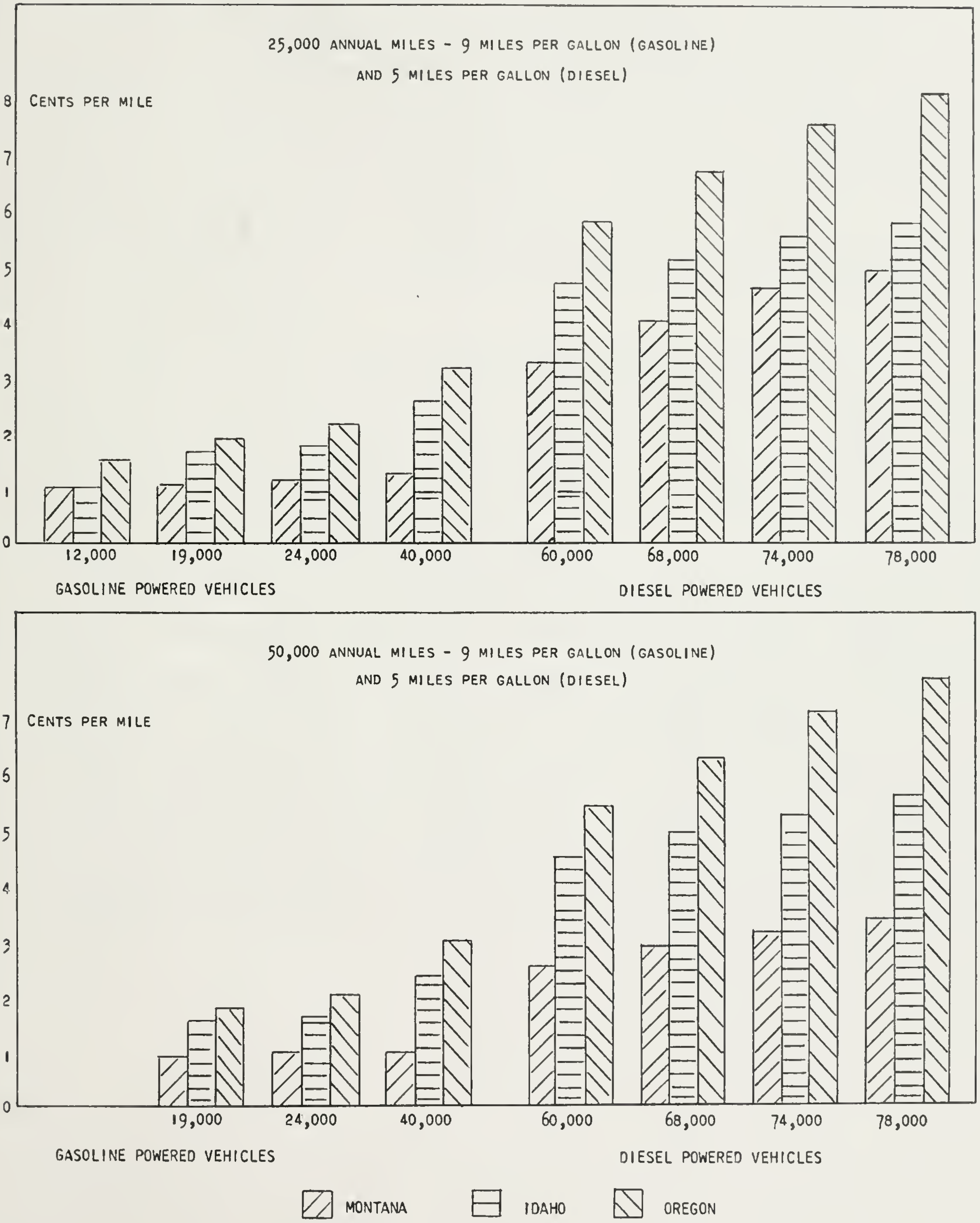


CHART I - B

COSTS PER MILE OF OPERATION UNDER VARYING CONDITIONS
BY GROSS VEHICLE WEIGHT CLASSES - MONTANA
IDAHO & OREGON CURRENT TAX SCHEDULES



Effects of Tax Schedules per Gross Vehicle Weight Mile

Another useful comparison is to ask what charges each tax schedule imposes per gross vehicle weight mile of travel. That is, for each combination of gross vehicle weight, annual miles, and fuel consumption, what is the charge under each tax schedule for moving a pound of gross vehicle weight one mile? Since gross vehicle weight and distance moved form the basis of the weight-distance taxes, this comparison will be especially important.

Tables 3A and 3B present these figures in terms of dollar costs per million gross vehicle weight miles. The differences among the three schedules for any given gross vehicle weight stand in the same relation as when costs were expressed per mile of travel. The various weight classes, however, now appear in a different light. On a per mile of travel basis the heavier vehicles appeared to be more heavily taxed. When the weight factor is added this picture is markedly changed. For gasoline powered vehicles the charge per gross vehicle weight mile is lower for a heavier vehicle. This occurs in the Idaho and Oregon schedules despite the fact that the mileage taxes in relation to weight increase with increasing gross vehicle weight. How this happens is shown by calculating the charges per gross vehicle weight mile (in the 25,000 annual miles and 6 miles per gallon for gasoline powered vehicles) in the

Table 3A
Dollar Costs per Million Gross Vehicle Weight Miles of Alternative Tax Schedules by Gross Vehicle Weight and Operating Conditions
(Gasoline Powered Vehicles)

Schedule, Miles per Gallon, and Annual Miles in Montana	Gross Vehicle Weight Class (pounds)			
	12,000	19,000	24,000	40,000
Montana				
6 m.p.g.				
25,000	$1.059	$ .719	$ .628	$ .392
50,000	-----	.667	.557	.342
9 m.p.g.				
25,000	.735	.515	.466	.294
50,000	-----	.462	.395	.244
Idaho				
6 m.p.g.				
25,000	1.056	1.043	.884	.726
50,000	-----	.985	.838	.675
9 m.p.g.				
25,000	.732	.838	.722	.629
50,000	-----	.780	.676	.578
Oregon				
6 m.p.g.				
25,000	1.470	1.169	1.032	.890
50,000	-----	1.115	.978	.828
9 m.p.g.				
25,000	1.146	.964	.870	.793
50,000	-----	.910	.816	.731

Table 3B
Dollar Costs per Million Gross Vehicle Weight Miles of Alternative Tax Schedules by Gross Vehicle Weight and Operating Conditions
(Diesel Powered Vehicles)

Schedule, Miles per Gallon, and Annual Miles in Montana	Gross Vehicle Weight Class (pounds)				
	60,000	68,000	74,000	76,000	78,000
Montana					
3 m.p.g.					
25,000	$ .737	$ .753	$ .765	$ .784	$ .772
50,000	.618	.597	.585	.589	.578
100,000	.559	.519	.495	.492	.481
5 m.p.g.					
25,000	.537	.576	.603	.626	.618
50,000	.418	.420	.423	.432	.424
100,000	.359	.343	.333	.334	.328
Idaho					
3 m.p.g.					
25,000	.965	.913	.891	.890	.890
50,000	.931	.883	.863	.863	.864
100,000	.914	.868	.850	.850	.851
5 m.p.g.					
25,000	.765	.736	.729	.733	.736
50,000	.731	.706	.701	.706	.710
100,000	.714	.691	.687	.692	.697
Oregon					
3 m.p.g.					
25,000	.948	.966	.996	1.013	1.056
50,000	.897	.909	.937	.954	.970
100,000	.862	.881	.908	.924	.940
5 m.p.g.					
25,000	.948	.966	.996	1.013	1.056
50,000	.897	.909	.937	.954	.970
100,000	.862	.881	.908	.924	.940

following way:

Schedule and Weight Class	Fees per 1,000 Miles Flat Fee	Fuel Tax	Mileage Tax	Total	Charge per Million G. V. W. Miles
Montana					
12,000	$1.04	$11.70	---	$12.74	$1.06
19,000	2.00	11.70	---	13.70	.72
24,000	3.40	11.70	---	15.10	.63
40,000	4.00	11.70	---	15.70	.39
Idaho					
12,000	1.00	11.70	---	12.70	1.06
19,000	2.20	11.70	5.95	19.85	1.04
24,000	2.20	11.70	7.35	21.25	.88
40,000	4.08	11.70	13.30	29.08	.73
Oregon					
12,000	1.48	11.70	4.50	17.68	1.47
19,000	2.04	11.70	8.50	22.24	1.17
24,000	2.60	11.70	10.50	24.80	1.03
40,000	4.92	11.70	19.00	35.62	.89

Note: If heavier vehicles use substantially more fuel per mile than lighter ones, our figures would need modification. But it is not likely to change the direction of the conclusions stated for gasoline powered vehicles. If the 40,000 pound vehicles in the Idaho schedule (which shows the least decrease in final charges with weight) operated at 4 m.p.g. rather than 6, the charge per million g.v.w. miles would rise only to $.87, still substantially less than the two lighter weight classes. Average fuel consumptions given in a competent study ("Gasoline Consumption, Weight, and Mileage of Commercial Vehicles," by Robley Winfrey; Highway Research Board, Bulletin #92, 1954) are approximately as follows for the weight classes we have used:

12,000 lbs. - 9 M.P.G.   24,000 lb. - 7½ M.P.G.
19,000 lbs. - 8 M.P.G.   40,000 lb. - 6 M.P.G.

These gasoline consumption figures decline over the range of weights by the same ratio we have assumed in the statement above.

On a per mile basis the fuel taxes are a relatively fixed amount regardless of weight group. In all these schedules the flat fees, when put on a per mile basis, increase at least in proportion to weight. In Idaho and Oregon the mileage taxes also increase more rapidly than weight. But since the fuel taxes are substantial, their fixed element prevails so

that total taxes per mile, when related to weight, decline as weight increases.

When we examine the variation in charges per gross vehicle weight mile with weight classes in the diesel powered vehicles, the type of change is different in each tax schedule. In the Oregon schedule, the flat fees are proportional to weight, while the mileage fees rise with weight faster than weight itself. With no fuel tax on diesels to introduce a relatively constant element per vehicle mile, or decreasing element per gross vehicle weight mile, the charges per gross vehicle weight mile increase with the heavier weight classes. The Idaho rates maintain the same flat fee over all diesel weight groups. This, combined with the fuel tax, introduces a decreasing charge per gross vehicle weight mile (with increases in weight) sufficient to offset a mileage fee schedule which contains greater charges in relation to weight as the weights increase. In the Montana rates, the charges per gross vehicle weight mile increase with weights at low annual mileages and decrease with weights at high annual mileages. This is a consequence of the varying importance of the fuel tax with varying annual miles travelled. The Montana flat fees increase in relation to weight in the higher weight classes. As illustrated before, the charges from the fuel tax tend to be relatively constant per mile regardless of weight, and hence tend to decrease with additional weight when placed on a per gross vehicle weight mile basis. In the lower annual mileage classes, fuel taxes comprise a smaller proportion of the over-all tax, and the behavior of the flat fees (increasing in relation to weight) predominates so that charges per gross vehicle weight mile increase with weight. In the higher mileage classes, the behavior of fuel taxes more than offsets

the fixed fees so that charges per gross vehicle weight mile become smaller with increases in gross weight.

Finally, one should note the decrease in charge per gross vehicle weight mile in any given weight class as annual miles are increased. In the Idaho and Oregon schedules, there is no great decrease in tax liability per gross vehicle weight mile from this source. However, in Montana, the decrease is substantial. This arises from the lack of any tax whose rate is fixed per mile of travel.

Differences in Tax Schedules Per Gross Vehicle Weight Mile

Most directly related to the possible impact of weight distance taxation in Montana are the differences in charges per gross vehicle weight mile. We have already presented (for each combination of gross vehicle weight, annual mileage, and fuel consumption per mile) the charges per gross vehicle weight mile for the three different tax schedules. This was followed by the discussion of the behavior of the separate tax schedules. We now need only strike the differences between the Montana rates and the two proposed schedules and follow through the implications. Table 4 presents these differences.

The differences between Montana's present rates and either of the alternative schedules vary considerably depending on the particular combination of annual miles, gross vehicle weight class, and fuel consumption per mile. But all that really need concern us are the smallest and largest differences between current Montana rates and each proposed schedule. If we can trace these through to final effects on consumer prices we will at least have established the range of possible impact of the proposed schedules of weight-distance taxes on consumers in Montana.

Table 4
Differences in Dollar Cost Per Million Gross Vehicle Weight Miles Between Montana and Idaho, and Montana and Oregon Schedules, Classified by Gross Vehicle Weight Class and Operating Conditions

Gasoline Vehicles - Idaho Rates Less Montana Rates

Miles per Gallon and Annual Miles in Montana	Gross Vehicle Weight Class (pounds) 12,000	19,000	24,000	40,000
10,000	$ .008[1]	$ .339	$-----	$-----
25,000	.003[1]	.324	.256	.334
50,000	-----	.318	.281	.334

Gasoline Vehicles - Oregon Rates Less Montana Rates

Operating Conditions	12,000	19,000	24,000	40,000
10,000	.466	.453	-----	-----
25,000	.411	.450	.404	.487
50,000	-----	.448	.421	.481

Diesel Vehicles - Idaho Rates Less Montana Rates

Operating Conditions	60,000	68,000	74,000	76,000	78,000
25,000	.228	.160	.126	.106	.118
50,000	.312	.286	.278	.274	.286
100,000	.354	.349	.354	.358	.369

Diesel Vehicles - Oregon Rates Less Montana Rates

Operating Conditions	60,000	68,000	74,000	76,000	78,000
3 m.p.g.					
25,000	.211	.213	.231	.228	.285
50,000	.278	.312	.352	.364	.392
100,000	.303	.362	.412	.432	.459
5 m.p.g.					
25,000	.411	.389	.393	.386	.439
50,000	.478	.489	.514	.522	.546
100,000	.503	.538	.575	.590	.613

[1] Montana rate exceeds Idaho rate.

These maximum and minimum differences for the combination of situations covered previously are as follows for diesel powered vehicles:

Table 5

Maximum and Minimum Tax Increases Per Million Gross Vehicle Weight Miles - Diesel Powered Vehicles

Idaho schedule versus Montana		
25,000-50,000 annual miles		
Maximum:	60,000 gross vehicle weight; 50,000 miles, any miles per gallon	$ .3123
Minimum:	76,000 gross vehicle weight; 25,000 miles, any miles per gallon	.1063
25,000-100,000 annual miles		
Maximum:	78,000 gross vehicle weight; 100,000 miles, any miles per gallon	.3694
Minimum:	76,000 gross vehicle weight; 25,000 miles, any miles per gallon	.1063
Oregon schedule versus Montana		
25,000-50,000 annual miles		
Maximum:	78,000 gross vehicle weight; 50,000 miles, 5 miles per gallon	$ .5455
Minimum:	60,000 gross vehicle weight; 25,000 miles; 3 miles per gallon	.2114
25,000-100,000 annual miles		
Maximum:	78,000 gross vehicle weight; 100,000 miles, 5 miles per gallon	.6125
Minimum:	60,000 gross vehicle weight; 25,000 miles, 3 miles per gallon	.2114

Impact on Delivered Price--An Example:

Let us single out the maximum difference of $.6125 per million gross vehicle weight miles and follow through an example. This will emphasize the additional factors which determine the impact on delivered price.

a. Load:

The maximum situation is for a vehicle of 78,000 gross vehicle weight. Only the weight in the actual load, however, can absorb the tax cost. The impact will be greater the smaller the load. We will deal with partial loads later, but for this first illustration let us assume a full load, which would be about 46,800 pounds.[1] Since we are more interested in the charge per pound-mile of actual load, let us make this conversion:

Charge per million gross vehicle weight miles x (g.v.w. ÷ actual load) = Charge per million actual load miles

$.6125 x (78,000 ÷ 46,800) = $1.0215

b. Distance:

The impact of a given load will depend directly on the distance hauled. If the above load is carried 100 miles in Montana to the delivery point, the total charge will be:

Total charge = Charge per million actual load miles x miles hauled

Total charge = $1.0215 x 100 = $102.15 per million pounds

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[1] This is based on a conversion factor for vehicles of over 8,000 pounds empty weight. The practical maximum load is stated to be about three-fifths of the gross vehicle weight ("Estimates of User Taxes Paid by Vehicles in Different Type and Weight Groups", by Edwin M. Cope, John T. Lynch, and Clarence A. Steel; Highway Research Board Bulletin #92, 1954 p. 17)

c. Weight-value ratio of goods hauled:

To translate the impact per pound for a particular load and trip into a percentage of the delivered price of the goods, we need to know the value of the goods per pound. If the goods are of low value in relation to weight the relative impact of the tax on delivered price will be more than for goods of high value in relation to weight. If the goods hauled on this example trip are worth \$2 a pound delivered, the ratio of weight to price is ½ or 0.5, and the impact on final price is:

Impact on final price = total charge per pound x pounds/price

$$\frac{\$102.15}{1,000,000} \times 0.5$$

Impact on final price = .000051075 = .005 percent

That is, 5 parts in 100,000

d. Summarization of factors:

The steps just illustrated can be summarized in one general statement for obtaining the relative impact on final price:

Relative impact = (difference per million gross vehicle weight miles) x (gross vehicle weight ÷ actual load) x (miles hauled) x (1 ÷ price per pound of goods hauled)

Thus we collect in one place the four factors affecting the final impact. These can be rearranged profitably in the following way:

a. Increase per million maximum load miles:

For all the diesel powered vehicles, maximum loads are about 3/5 of gross vehicle weight. Therefore, all the increases per million maximum load miles will be 5/3 times the figure already given for increases per million gross vehicle weight miles.

b. Load impact-distance:

Now we introduce the possibility of less than maximum loads. This may occur because the vehicle is only partly filled, or because a capacity load of bulky goods may not amount to a capacity load by weight. A load comprising one-half of the maximum load (by weight) will have to absorb twice as much cost per pound as a capacity load. The load impact factor is the ratio by which the increase per million maximum load miles must be multiplied to obtain the increase per million load miles for the actual load. Thus the load impact factor by itself is:

1 ÷ (actual payload/maximum payload)

and equals 1.0 for a maximum actual load, 2.0 for a load equal to 1/2 the maximum load, 5.0 for a load equal to 1/5 of the maximum load, and so on.

In the original example we treated distance by itself. Now we combine distance with the load impact factor and obtain a load impact-distance factor which is measured in miles. The reason for this is that there are numerous combinations of actual loads and distances which are equivalent as to the tax impact per pound of goods. A maximum load carried 200 miles will receive the same tax increase per pound of goods as 1/2 a maximum load carried 100 miles, or 1/4 a maximum load carried 50 miles. In terms of a load-impact distance factor, these are all the same:

Load impact	x	Distance	=	Load impact distance
1.0	x	200 miles	=	200 miles
2.0	x	100 miles	=	200 miles
4.0	x	50 miles	=	200 miles

c. Weight-value ratio:

This is equal to the number of pounds of goods comprising a delivered value of one dollar, or 1.0 divided by the dollar value per pound delivered goods.

d. Combining the factors:

The concept of load impact-distance permits us to reduce the number of separate factors from four to three, or from three to two for any given increase per million gross vehicle weight or maximum load miles. In our previous illustration these factors would be:

a. Increase per million maximum load miles = \$.6125 x 5/3 = \$1.0215

b. Load impact-distance factor = 1.0 x 100 = 100 miles

c. Weight-value factor = 1.0 ÷ (\$2.00 per pound) = .50 pounds per dollar and the relative impact on delivered price (as previously)

$$\frac{\$1.0215}{1,000,000} \times 100 \times .50 = .000051075 = .005 \text{ percent}$$

Schedules of Effects as a Percent of Delivered Price

Using the approach just developed, tables can be constructed for any tax increase per million gross vehicle weight miles from which one can read the potential percentage increase in price for any combination of load, distance, and value of material. Such a table is shown below for the maximum possible increase per million gross vehicle weight miles between the Montana and Oregon schedules.

A sample statement from this table would read as follows:

> If a load of goods worth at delivery point 10 cents a pound (10 lb. per dollar) and comprising 50 percent by weight of the maximum load of a 78,000 lb. gross weight vehicle (which travels 100,000 during the year averaging 5 miles per gallon of fuel) is transported 100 miles in Montana, the increase in tax if Montana adopted Oregon's tax schedule would amount to 0.2 percent of the delivered price. Further, there is no other combination of vehicle type, annual miles of travel, and fuel consumption per mile by which the same goods similarly loaded could be transported this distance with any greater increased tax effect.

Table 6
Maximum* Impact as a Percent of Previous Delivered Price Under Varying Conditions of Load, Distance and Value of Material

Weight-Value ratio (Pounds per dollar)	Load Impact-Distance (Miles)					
	50	100	200	500	1000	2000
.20	.0010	.0020	.0041	.0102	.0204	.0408
.50	.0025	.0051	.0102	.0255	.0510	.1020
1.00	.0051	.0102	.0204	.0510	.1020	.2041
2.00	.0102	.0204	.0408	.1020	.2041	.4082
5.00	.0255	.0510	.1021	.255	.510	1.021
10.00	.0510	.1021	.2041	.510	1.020	2.041
100.00	.510	1.021	2.041	5.10	10.20	20.41

* The maximum conditions are as follows: adoption of Oregon rate schedule; a diesel vehicle of 78,000 g.v.w. travelling 100,000 miles per year at 5 miles per gallon of fuel consumed.

Similar tables could be constructed for the other diesel truck "situations" covered in Table 6. The values in the one table presented can be easily "converted" to apply to these other situations, however. The conversion factor to apply is the ratio of the increase per million gross vehicle weight miles given in Table 4 for the desired situation to the increase per million gross vehicle weight miles on which the present table was based. For instance, if the goods in the illustration above were similarly loaded and transported, but by a 60,000 pound gross vehicle weight unit which obtained only 3 miles to a gallon of fuel, the tax increase as a percent of delivered price would be:

$$.2041 \times (\$.2114 \div \$.6125) = .0704 \text{ percent}$$

Similarly, values for conditions not on the table can be found by conversion factors which link the desired situation with one given in the table. A bulky low value material worth 2 cents a pound (50 pounds per dollar) constituting fully loaded only 1/5 of a capacity load by weight and transported 100 miles would receive an increased tax burden equal to 2.55 percent of its delivered price under the maximum conditions described previously. We obtain this by multiplying the impact for a load impact-distance of 500 miles and weight-value ratio of 10 by 5 to achieve the desired weight-value ratio of 50.

Thus, by using conversion factors for other than maximum conditions and conversion factors for any weight-value or load impact-distance not given in the table, the potential impact can be readily found for almost any situation.

Conversion Factors for All Maximum and Minimum Conditions

Having traced through the steps leading up to the construction of tables of possible percentage impacts on delivered prices and how they can be converted from one set of vehicle conditions to another, we need now only a set of conversion factors to apply to the maximum table given to get tables for other limiting situations. In the conversion factors for gasoline units of 12,000 pounds gross vehicle weight we need to consider that the maximum payload is more nearly one-half of the gross vehicle weight rather than three-fifths.[1] Except for this one weight group, all other maximum loads are considered to be three-fifths of gross vehicle weight. Table 7 gives the maximum and minimum conversion factors for both gasoline and diesel powered vehicles in both rate schedules under study.

Table 7
Percentage Which Maximum and Minimum
Impacts by Schedule and Vehicle
Type are of Overall Maximum
Impact

Vehicle Type	Oregon Schedule		Idaho Schedule	
	Maximum	Minimum	Maximum	Minimum
Gasoline	91.3	65.9	55.3	- 1.6*
Diesel	100.0	34.4	60.2	17.3

* Represents a saving under the Idaho schedule.

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[1] Cope, Lynch, and Steel, op. cit.

THE PROPOSED TAX SCHEDULE

Introduction

The weight-distance tax schedule currently being proposed in Montana is shown as Table 8.[1] For vehicles of 24,000 pounds gross vehicle weight or less no mileage fee is to be charged. For vehicles above 24,000 gross vehicle weight there are two schedules. Schedule A, with lower mileage rates, is for vehicles paying the Montana fuel tax. This applies to gasoline vehicles purchasing their fuel in Montana. Schedule B, with higher mileage rates, applies to diesel vehicles purchasing fuel in Montana (the diesel fuel tax will not be collected at the point of purchase) and all vehicles not purchasing their fuel in Montana.

Tax Costs per Mile

We have selected three vehicle types to show the difference in tax costs per mile under the new tax schedule. These are 1) a 40,000 gasoline combination operating under Schedule A; 2) a 60,000 diesel combination operating under Schedule B; and 3) a 78,000 diesel combination operating under Schedule B. In each case we have assumed that the vehicle paid the fuel taxes under the present tax system on all their miles of operation. The registration fee of $20 for the two unit combination has been added to the fixed fees shown in the proposed schedule. Table 1, the current tax schedule, already includes this fee.

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[1] Most of this study was completed before the proposed schedule became known. For this reason, results heretofore in the study have been carried in terms of the neighboring Idaho and Oregon rates.

Table 8
Proposed Weight-Distance Tax Schedule for Montana

Total Gross Weight Of Solo Truck or Combination Pulling And Trailing Unit (Pounds)	Annual Flat Fee		Additional Fee Per Mile of Operation (No Credit for Empty or Partial Loads.)	
	Farm Vehicles ($)	Commercial Vehicles ($)	Schedule A Vehicles paying Montana Fuel Tax (Mills)	Schedule B Vehicles Not paying Montana Fuel Tax (Mills)
Under 6,000	4.00	6.00		
6,001 to 8,000	5.00	16.00		
8,001 to 10,000	6.00	30.00		
10,001 to 12,000	7.00	36.00		
12,001 to 14,000	8.00	42.00		
14,001 to 16,000	10.00	48.00		
16,001 to 18,000	11.00	54.00		
18,001 to 20,000	12.00	60.00		
20,001 to 22,000	13.00	66.00		
22,001 to 24,000	14.00	72.00		
24,001 to 26,000		78.00	2.8	16.9
26,001 to 28,000		84.00	4.0	18.6
28,001 to 30,000		90.00	5.2	20.3
30,001 to 32,000		96.00	6.5	21.9
32,001 to 34,000		102.00	7.7	23.7
34,001 to 36,000		108.00	9.0	25.3
36,001 to 38,000		114.00	10.2	27.0
38,001 to 40,000		120.00	11.4	28.7
40,001 to 42,000		126.00	12.7	30.3
42,001 to 44,000		132.00	14.0	32.0
44,001 to 46,000		138.00	15.2	33.7
46,001 to 48,000		144.00	16.4	35.3
48,001 to 50,000		150.00	17.7	37.1
50,001 to 52,000		156.00	18.9	38.7
52,001 to 54,000		162.00	20.1	40.4
54,001 to 56,000		168.00	21.4	42.1
56,001 to 58,000		174.00	22.7	43.8
58,001 to 60,000		180.00	23.9	45.4
60,001 to 62,000		186.00	25.1	47.1
62,001 to 64,000		192.00	26.3	48.8
64,001 to 66,000		198.00	27.7	50.5
66,001 to 68,000		204.00	28.8	52.1
68,001 to 70,000		210.00	30.1	53.8
70,001 to 72,000		216.00	31.3	55.5
72,001 to 74,000		222.00	32.6	57.2
74,001 to 76,000		228.00	33.8	58.8
76,001 to 78,000		234.00	35.1	60.5
Over 78,000	35 cents per CWT		Add 1.5 mills for each additional 2,000 pounds	Add 1.9 mills for each additional 2,000 pounds

Tax Costs per Million Gross Vehicle Weight Miles

As in the discussion of differences between the present Montana and the two neighboring states' tax schedules, the conversion of tax rates to costs per million gross vehicle weight miles yields a basis very closely related to the tax impact on loads carried. The differences per mile of Table 9 have been converted to differences per million gross vehicle weight miles and presented in Table 10.

Impacts According to Load-Distance and Value of Materials Hauled

While there is some variation through the range of annual miles and vehicle types shown in the table, a range of \$.30 to \$.40 difference per million gross vehicle weight miles includes a decided majority of the more usual annual miles classes. To be on the conservative (high) side we have selected a difference of \$.40. This is the equivalent of \$.67 per million maximum load miles if, as before, maximum loads are approximately three-fifths of gross vehicle weight. On this basis the following table gives possible impacts of the proposed tax schedule for vehicles of the type described in Table 10. These impacts are given as percentages of the delivered price of goods carried for varying value-weight ratios of the goods and varying combinations of distance hauled and percentage of maximum load carried. Remember that a 50 percent of maximum load hauled 100 miles is the equivalent of 200 load impact-distance miles, a 75 percent load carried 300 miles equals 400 load impact-distance miles, and so forth.

Table 9
Tax Costs per Mile of Operation Under Current and Proposed Montana Schedules for Three Selected Combination Units

Vehicle Type and Tax Schedule	Annual Miles of Operation 10,000	20,000	30,000	40,000	50,000	75,000	100,000
40,000 g.v.w. gas[1]							
Proposed "A"	$.0405	$.0335	$.0312	$.0300	$.0293	$.0284	$.0279
Present	.0251	.0201	.0184	.0176	.0171	.0164	.0161
Difference	.0154	.0134	.0127	.0124	.0122	.0119	.0118
60,000 g.v.w. diesel[2]							
Proposed "B"	.0654	.0554	.0521	.0504	.0494	.0481	.0474
Present	.0535	.0358	.0298	.0269	.0251	.0227	.0216
Difference	.0119	.0196	.0222	.0235	.0243	.0253	.0258
78,000 g.v.w. diesel[3]							
Proposed "B"	.0859	.0732	.0690	.0668	.0656	.0639	.0630
Present	.0959	.0582	.0456	.0393	.0356	.0305	.0280
Difference	-.0100[4]	.0150	.0234	.0275	.0300	.0334	.0350

[1] Operating at 4.64 miles per gallon and paying a fuel tax of $.07 per gallon under both present and proposed systems.
[2] Operating at 5.00 miles per gallon and paying a fuel tax of $.09 per gallon under present system.
[3] Operating at 4.44 miles per gallon and paying a fuel tax of $.09 per gallon under present system.
[4] Current rate greater than under proposed schedule.

Note: Differences may not agree in final decimal because of rounding of original figures for presentation. The above miles per gallon figures are those currently used as "standard" by the Montana Fact Finding Committee on Highways, Streets, and Bridges.

Table 10
Differences in Tax Cost per Million Gross Vehicle Weight Miles Under Current and Proposed Tax Schedules for Three Selected Combination Units

Vehicle Type [1]	10,000	20,000	30,000	40,000	50,000	75,000	100,000
40,000 g.v.w. gas	$.3850	$.3350	$.3184	$.3100	$.3050	$.2983	$.2950
60,000 g.v.w. diesel	.1983	.3275	.3706	.3921	.4050	.4222	.4308
78,000 g.v.w. diesel	-.1282[2]	.1923	.3000	.3526	.3846	.4282	.4487

[1] See footnotes to Table 9.

[2] Current rate greater than under proposed schedule

Table 11
Approximate Increase in Transportation Taxes as a Percent of Current Delivered Value of Goods Which Would Result from Proposed Weight-Distance Tax Under Varying Conditions of Load, Distance and Value of Material Hauled for Three Selected Vehicle Types

Weight-Value Relationship of Goods Carried	Load Impact-Distance (Miles)					
	50	100	200	500	1000	2000
.20 or $5.00 per lb.	.00067	.00133	.00267	.00567	.01333	.02667
.50 or 2.00 per lb.	.00167	.00333	.00667	.01667	.03333	.06667
1.00 or 1.00 per lb.	.00333	.00667	.01333	.03333	.06667	.13333
2.00 or .50 per lb.	.00667	.01333	.02667	.06667	.13333	.26667
5.00 or .20 per lb.	.01667	.03333	.06667	.16667	.33333	.66667
10.00 or .10 per lb.	.03333	.06667	.13333	.33333	.66667	1.33333
50.00 or .02 per lb.	.16667	.33333	.66667	1.66667	3.33333	6.66667
100.00 or .01 per lb.	.33333	.66667	1.33333	3.33333	6.66667	13.33333

Very few conditions in this table yield tax increases as high as one percent of the previous delivered value of the goods hauled. The table below reorganizes the material of Table 11 in a way designed to bring out the situations which can result in increases exceeding one percent of the value of the goods hauled by the three vehicle types under consideration. Reading several entries in this table brings out that trucks of this type carrying 50 percent of their maximum load must transport goods worth 2 cents a pound at least 150 miles for more than a one percent impact to result. Similarly, a vehicle fully loaded must carry goods worth 2 cents a pound at least 300 miles or goods worth one cent a pound at least 150 miles to point of delivery for the same result. A trip of 150 miles with a vehicle of the kind described loaded to 25 percent of its maximum load with goods worth 4 cents a pound would also achieve a one percent impact.

Table 12
Length of Trip Required for Percentage Impact of Increased Vehicle Taxes to Approximate One Percent for Various Values of Material and Percent of Maximum Load Carried[1]

Value of Material ($ per Pound)	Percent of Maximum Load 25	50	100
.01	37	75	150
.02	75	150	300
.03	112	225	450
.04	150	300	600

[1] Based on a difference in tax cost per million gross vehicle weight miles of $.40. The 25, 50, and 100 percent loads represent payloads of 15, 30, and 60 percent of registered gross vehicle weights.

Specific Illustrations

In the following section illustrative hauls for various types of goods presented, and the impact of the increased tax as a percentage of delivered value of goods worked out. These illustrations are not intended to represent average experience in the situations covered. Data of the kind required are not available covering all trips of a particular kind over a period from which a statistical "average trip" could be derived. They do represent situations which, based on interviews with persons in the businesses concerned, we believe actually exist. We have tried to avoid illustrations which these persons felt were definitely not typical for their businesses. We tried also to select illustrations which would not be unusual as compared with state-wide experience. But this is a matter of our own intuitive judgment strengthened in some cases by the judgment of businessmen interviewed, and is certainly open to question. One may, by methods similar to ours, work out the result for any illustration he desires. The key figure

in each instance is the applicable increase in tax cost per million gross vehicle weight miles from Table 10.

Illustration 1 Beverages

A 24,000 gross vehicle weight gasoline powered vehicle delivers on a round trip of 200 miles 150 cases of bottled beer weighing 40 pounds per case for a payload of 6,000 pounds. Under the new tax schedule this gross vehicle weight class pays only a flat fee of $82.[1] compared with $85. under the present tax schedule. Thus there is no increase in tax, and impact of the new schedule is a negligible negative one when this difference is spread over the total vehicle weight miles of the truck and a proportion allocated to this single trip.

Illustration 2 Automobile Carrier

A 40,000 gross vehicle weight gasoline combination travelling 10,000 annual miles in Montana transports four automobiles worth $2975 each at retail a round trip distance in Montana of 250 miles. The automobiles weigh about 3500 pounds each giving a payload of 14,000 pounds. If the vehicle buys its fuel inside Montana, the tax difference per million gross vehicle weight miles from Table 10 applies, and with the facts given yields a percentage impact on retail price of:

$$\frac{.385}{10^6} \times \frac{40,000}{14,000} \times 250 \times \frac{3500}{2975} = .00032 \text{ or } .032 \text{ percent}$$

If the vehicle customarily escapes the Montana fuel tax by buying fuel outside the state, the new Schedule B would apply. The vehicle would pay $120 annual fee plus $20 registration fee plus $287 in mileage taxes, while under the present schedule it pays only a $100 flat fee. This is a difference of $327 or $.0327 per mile, or $.8175 per gross vehicle weight

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[1] $72 annual flat fee shown in the schedule plus $10 registration fee for a solo unit.

mile. Under these conditions the impact of the proposed tax would be $.8175/$.3850 times that given for the first situation, or .068 percent of delivered value.

Automobiles are sometimes trucked into Western Montana from the east on a round trip of 700 miles. Under the same conditions of load and value given above, the increased tax impact, if fuel were bought in Montana, would be 700/250 x .032 or .090 percent.

Illustration 3 Mixed Groceries

A grocery wholesaler makes a delivery of mixed groceries on a round trip of 175 miles. Using a 60,000 g.v.w. diesel vehicle which travels about 40,000 miles a year, he delivers a payload of 32,000 pounds. If the shipping weight per dollar retail value of dry groceries averages 6 pounds, then the tax increase as a percent of retail price for groceries as a group on this delivery trip is:

$$.39/10^6 \quad \times \frac{60{,}000}{32{,}000} \quad \times 175 \quad \times \ 6 = \quad .00077 \text{ or } .077 \text{ percent}$$

The tax increase on this trip as a lump sum is:

$$\frac{60{,}000 \times 175}{10^6} \quad \times \quad \$.39 \text{ or } \$4.10$$

Particular groceries vary in their ratios of shipping weight to average retail price. A selection is given below, together with the percentage tax increase resulting from the trip above if the tax burden is distributed according to shipping weights.[1]

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[1] The prices given are average retail prices for Montana prevailing on August 20, 1956 as reported by the Department of Labor and Industry. Shipping weights are actual shipping weights for the standard canned goods and estimated at about 1.15 times net weights for most packaged items.

Item	Value	Net Weight (lb.)	Estimated Shipping Weight (lbs.)	Weight-Value Ratio	Percent Impact
Honey, 5 lb. tin	$1.21	5.00	6.00	5.0	.064
Soda crackers, 2 lb.	.46	2.00	2.30	5.0	.064
Vanilla cookies, 7 oz.	.26	.44	.50	1.0	.024
Peaches, No. 2½ can	.32	1.88	2.25	7.0	.090
Flour, 10 lb. bag	.97	10.00	11.50	11.9	.153
Rolled oats, 3 lb. bag	.41	3.00	3.50	8.5	.109
Corn Flakes, 8 oz. pkg.	.17	.50	.60	3.5	.045
Wheat Cereal, 28 oz.	.36	1.75	2.00	5.6	.072
Macaroni, 1 lb. ctn.	.24	1.00	1.15	4.8	.062
Rice, 1 lb. pkg.	.20	1.00	1.15	5.8	.074
Navy Beans, 1 lb.	.18	1.00	1.30	7.2	.092
Potatoes, No. 1, 10 lb. bag	.57	10.00	10.50	18.4	.236
Corn, No. 303 Std.	.15	1.00	1.33	8.9	.114
Peas, No. 303 Std.	.15	1.00	1.33	8.9	.114
Tomatoes, No. 2 Std.	.17	1.33	1.50	8.8	.113
Sugar, 10 lb. bag	1.15	10.00	11.50	10.0	.128
Coffee, 1 lb. vacuum	1.06	1.00	1.40	1.3	.017

Illustration 4 **Mixed Household Goods**

A 40,000 gross vehicle weight gasoline unit travelling 30,000 annual miles in Montana carries a mixed load of 20,000 pounds of household goods 200 miles within the state to a delivery point. If the household goods are worth $1 a pound at retail, the increase in tax as a percentage of retail value is:

$$\frac{.32}{10^6} \times \frac{40,000}{20,000} \times 200 \times 1.0 = .00120 \text{ or } .013 \text{ percent}$$

Household goods actually vary in their weight-value ratios. Below is a selection together with the resulting relative tax impact.[1]

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[1] These prices are not intended to represent average or typical prices in Montana. The items were selected from Sears Roebuck & Company's current mail order catalogue because of definiteness of price and ease of obtaining shipping weights. Shipping costs were not added to the price before the weight-value ratios were calculated. To the extent that shipping costs are significant and to the extent that other net retail prices in Montana are higher for similar items of equal weight, the weight value ratios here are overestimates of actual shipping weights to delivered value ratios in Montana. Thus the tax impacts in the table are conservative, that is, higher than might actually be the case.

Item	Value	Shipping Weight (lbs.)	Weight-Value Ratio	Tax Impact (Percent)
10 cubic foot refrigerator	$190.	310	1.6	.021
Automatic washer	170	239	1.4	.018
Table model T.V. 21"	175.	72	.4	.005
Sofa and Chair, latex cushion	220.	188	.8	.010
7 piece chrome-steel dinette set	95.	156	1.6	.021
Asphalt tile, carton of 48	3.30	31	9.4	.122
Carpet 9 x 12', good quality Axminister	82.	39	.5	.006
Woven cotton yard goods 1 yd. 38" wide	.39	3/16	.5	.006
2 good muslin sheets 81 x 99"	3.48	3 6/16	1.0	.013
Steel executive desk, 32 x 60"	150.	300	2.0	.026
Asphalt lock shingles, bundle	3.40	83	24.4	.317
Tire, rayon body, 670-15	18.04	23	1.3	.017

Illustration 5 **Delivery of Petroleum**

A 78,000 g.v.w. diesel combination running about 50,000 miles a year carries 5,500 gallons of gasoline on a delivery route of 200 miles round trip. At 6.6 pounds per gallon of gasoline the payload is about 36,000 pounds.

A retail price of gasoline of $.37 a gallon or $.056 a pound is equal to 17.9 pounds per dollar. The impact of the tax is:

$$\frac{.38}{10^6} \times \frac{78,000}{36,000} \times 200 \times 17.9 = .0029 \text{ or } .29 \text{ per cent}$$

The total haul amounts to 78,000 x 200 or 15,600,000 gross vehicle weight miles. The increase in tax to be paid by the trucker for this trip is (15,600,000 ÷ 1,000,000) x $.38 or $5.93.

Illustration 6 Farm Supplies and Produce

A 78,000 g.v.w. combination averaging 50,000 annual miles carries a 39,000 pound load of fertilizer and feed worth \$80. a ton 300 miles to point of delivery. On a return trip of 300 miles it carries an equal load of barley worth approximately \$40. a ton. The increased tax cost on the outgoing trip in relation to the value of the fertilizer and feed is:

$$\frac{.38}{10^6} \times \frac{78,000}{39,000} \times 300 \times 25 = .0057 \text{ or } .54 \text{ per cent}$$

On the return trip with barley the relative increased tax impact is twice the above or 1.14 per cent.

The round trip haul amounts to 78,000 x 600 or 46,800,000 g.v.w. miles. The dollar increase in tax for the round trip is approximately 46.8 x \$.38 or \$17.78.

Illustration 7

A Logging Trip

A 74,000 g.v.w. diesel combination running about 40,000 annual miles per year transports on a round trip of 120 miles spruce logs weighing about 7 pounds to the board foot. The payload is 57,140 board feet or 40,000 pounds. The value of the logs is about $52. a thousand board feet at the mill or 135 pounds per dollar. The tax increase per million g.v.w. miles for this unit is not shown in Table 10, but works out to $.385.[1] The relative impact of the tax as a per cent of delivered value of the logs is:

$$\frac{.36}{10^6} \times \frac{74,000}{40,000} \times 120 \times 135 = .0108 \text{ or } 1.08 \text{ per cent}$$

The total haul amounts to 74,000 x 120 or 8.88 million g.v.w. miles. The increased tax as a dollar sum to be paid by the trucker is 8.88 x .36 or $3.20. At present the transportation charge for the trip is at the rate of $12. a thousand board feet, or $68.57 for the trip. This is a 4.7 per cent increase in the transportation charge.

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[1] Yearly tax costs under the present system, assuming 4.5 miles per gallon of fuel is $665. plus (40,000 ÷ 4.5) x .09 or $665 annual fee plus $800 fuel tax. Under the proposed system costs would be $222 annual fee plus $20. registration fee for the combination, plus mileage tax of 57.2 mills on 40,000 miles or a grand total of $2530. This is a difference of $1065. per year, $.0266 per mile, or $.360 per million g.v.w. miles. If the trucker pays only 75 per cent of the regular present annual fee, the impacts are about 15 per cent higher than shown above (1.24 per cent; $3.68; and 5.4 per cent).

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